▶ NSF and the Department of Education should collaborate in a major effort at the pre-college level aimed at reversing the "steadily increasing demand for remedial mathematics and science instruction in colleges and universities."

The Neal report's demand for an increase of $100 million in NSF funding for undergraduate education has aroused some consternation in the physics research community because of worries associated with the Gramm–Rudman–Hollings budget-reduction law. The concern is that if spending on education goes up, spending on research will have to go down by a similar proportion.

Background. AAPT and APS were among the organizations that testified to the Neal committee, and considering that their principal recommendation was for increased funding for laboratory equipment (PHYSICS TODAY, February, page 65), it would seem that their message got through.

Neal says that testimony to the committee, including the reports by Robert R. Wilson (Cornell) and Anthony P. French (MIT) on the conference of physics-department heads, was a major factor in the committee's conclusions. In addition, Neal says, many nonspecialists such as university presidents brought the message that some needs once addressed by Federal programs are no longer being addressed. The wealth of information at NSF itself also was useful, Neal observes, and Betty Vetter, executive director of the Scientific Manpower Commission, provided valuable data. Finally, he says, the committee members had their own personal experiences and impressions to draw on.

Neal reports that in the next phase, workshops will be set up at NSF to evaluate specific needs in mathematics, engineering and the physical sciences. Participants in the workshops will be asked what programs should be supported if NSF increases funding to the levels recommended by the Neal panel. Participants will also consider, according to Neal, matters such as whether a few centers should be set up around the country for laboratory and curriculum development and how the new NSF-supported engineering research centers might play some direct role in undergraduate education.

—WILLIAM SWEET

Survey of materials research is launched

Materials research has evolved in the past two decades from work going on separately in physics, chemistry, metallurgy, electrical engineering and other disciplines. As researchers merged their theories, concepts, techniques and analytic tools, it became difficult to identify those fields separately. "We now appreciate that there are unifying factors that distinguish us," says Praveen Chaudhari of the IBM Thomas J. Watson Research Center. "This is not only true in understanding nature but in applying that understanding to important new technologies."

The specialty has been championed recently on many fronts—from the Commerce Department to the National Research Council and the House Science and Technology Committee—as central to the nation's scientific leadership and competitive edge in electronics, energy and defense technologies. Since the steady advances in solid-state technology of the 1950s and 1960s, scientific understanding of complex materials has increased rapidly, due in large part to progress in electron microscopy, neutron-scattering techniques, synchrotron radiation sources and such spectroscopies as nuclear magnetic resonance.

Despite the obvious success, exciting opportunities in materials science and engineering may be stymied, argue many in the field, by the lack of Federal support for new equipment, facilities and researchers. After listening to academics and industrialists issue such dire forecasts, Representative Don Fuqua, the Florida Democrat who is chairman of the House Science and Technology Committee, decided it was about time to "take stock" of the field. He asked Frank Press, president of the National Academy of Sciences, to undertake an examination of materials science and engineering. In response to Fuqua's letter, NAS and its companion National Academy of Engineering directed the National Research Council to launch the first extensive survey of materials research. The study began last December.

Modeled on the sweeping *tours d'horizon* that panels of the Research Council have conducted for physics and chemistry, the materials study is expected to be equally comprehensive. Its participants will number about 100 in all. A 17-member committee (see box) under the joint chairmanship of Chaudhari and Merton C. Flemings of MIT will coordinate the activities of this group. Moreover, the tour will be guided by a steering committee headed by Albert Narath of AT&T Bell Laboratories and Arden Bement of TRW, Inc. The survey is expected to take two years and cost about $750 000, mainly from the National Science Foundation and the Departments of Defense and Energy. A thorough survey of the dynamics of the field is timely, perhaps even tardy, explains Chaudhari, for both intellectual and business reasons. "The field is known for its scientific excitement and its practical engineering applications," says Chaudhari.

The task statement calls for "a unified view" of recent progress and new directions in materials science and engineering and for a full assessment of future opportunities and needs. The study is organized into five panels, each dealing with a different aspect:

▶ The first panel will set forth various opportunities and requirements for advancing the field. Describing the work of this panel, Chaudhari says, "It will ask materials researchers, along with government officials in places like the Defense and Energy Departments and people in selected private industries, to put on their visionary caps and tell us what lies ahead for materials science and engineering during the next decade or decade and a half."

▶ The second panel will examine how knowledge and technology reach scientific practitioners and the ways ideas are translated into technology. Considering the cultural history of technology transfer in the US, says Chaudhari, "it will be interesting to find out if our processes and procedures are better or worse than those in Europe or the Far East. We want to know how new

Materials science committee

Praveen Chaudhari, IBM Corp, *cochairman*
Merton C. Flemings, MIT, *cochairman*
Martin Blume, Brookhaven National Laboratory
Alan Chynoweth, Bell Communications Research Inc
Jerome Cohen, Northwestern University
W. Dale Compton, Ford Motor Co (now National Academy of Engineering)
Robert S. Hansen, Ames Laboratory, Iowa State University
John Hulm, Westinghouse Electric Corp
R. Glen Kepler, Sandia National Laboratory
James Langer, University of California at Santa Barbara
Terry L. Loucks, Norton Co
George Parshall, E. I. DuPont de Nemours & Co
Rustum Roy, Pennsylvania State University
Lyle Schwartz, National Bureau of Standards
James O. Stiegler, Oak Ridge National Laboratory
George Whitesides, Harvard University
James C. Williams, Carnegie–Mellon University

technologies happen in this field." The goal is to improve organizational modes for facilitating high-tech transfers, not to come up with endorsements or alternatives to Japan's Ministry for Trade and Industry or the US's Microelectronic and Computer Technology Corp.

▶ The third panel plans to evaluate how materials research is done in other countries. How are priorities set for research projects? How do universities, industries and the government interact to advance the field? The panel will look at the ways other industrialized nations use materials R&D to improve their export trade and will consider whether basic research in the US would benefit from international cooperation or whether the preferable way is to "go it alone."

▶ Panel four will survey issues relating to manpower and facilities in US universities, national laboratories and industrial research centers. In studying these matters, the panel will consider current needs for new researchers and equipment, then attempt to predict similar needs a decade or so hence.

▶ The fifth panel will concentrate on how materials researchers are trained and what changes may be necessary to attract and retain the best and brightest. This panel also will study the likely effects of breaking down traditional barriers to interdisciplinary science and engineering education at the nation's colleges and universities.

—IRWIN GOODWIN

Fuqua to retire after 12 terms in House

In a decision that took his colleagues, staff and constituents by surprise, Representative Don Fuqua, the much-admired Democrat who heads the House Committee on Science and Technology, announced in his Florida district on 14 March that he would not seek reelection in November. Fuqua is now serving his 12th term in the House, the last four as the respected head of the science committee. The committee oversees the programs, management and budgets of several government aerospace agencies, including NASA of course.

First elected in 1963, Fuqua is, at the age of 53, still young enough to pursue another career. So upon his retirement next January, he will become president and general manager of Aerospace Industries Inc, a Washington trade association representing the nation's space and defense contractors.

As a freshman in Congress, Fuqua was named to the Committee on Science and Astronautics, which later took the present committee name. He served continuously as chairman of the Subcommittee on Space Science and Applications from 1971 until 1981. He became chairman of the full committee in 1979 upon the retirement of Representative Olin E. (Tiger) Teague of Texas.

Most science leaders in Washington consider Fuqua, in the words of NSF director Erich Bloch, "a true friend of research." Bloch characterizes Fuqua as "someone who knows what science and engineering are all about." On 15 May, Fuqua received NSF's Distinguished Public Service Award for, as the citation reads, "his unwavering support for basic research and education during his 24 years in Congress."

Fuqua always could be counted on to provide forums for scientists and administrators who wanted to speak out on government decisions or particular events. At Fuqua's initiative, his committee organized a special task force on science policy (PHYSICS TODAY, October 1984, page 59), which has gone on to conduct the widest and deepest evaluation of the relationship of science and government since the 1963–64 Select Committee on Government Research in the House of Representatives, led by then-Congressman Carl Elliott of Alabama. The Elliott committee examined the full range of R&D in 11 agencies, including the Defense Department. The Fuqua task force expects to submit a draft of its conclusions to some members of scientific, academic and industrial organizations for comments in late summer and issue its full report in October.

US and Soviet academies sign agreement

The National Academy of Sciences signed a new two-year agreement on scientific cooperation with the Soviet Academy of Sciences on 1 April. The agreement provides for regular meetings of officers of the two academies, exchanges of academy members, workshops, cooperative research in areas to be specified and exchanges of individual scientists.

NAS President Frank Press is known to have been eager to resume exchanges with the USSR since 1984, but concern about Soviet mistreatment of dissidents was an obstacle to negotiations. There is no direct evidence that the agreement was linked in any way to high-level understandings about human rights, and Press concluded the agreement without seeking or getting a go-ahead signal from the Reagan Administration. But the State Department was kept abreast.

The agreement provides for officers of the two academies to meet at least once a year to discuss possible areas for workshops and cooperative research. The meetings will alternate between the United States and Soviet Union. The academies are to exchange up to six members, designated "Academy Scholars," for scientific visits of two to four weeks each. Plans for the exchanges will be made once a year at joint meetings of the academies. Research scientists will be nominated for exchanges by each academy in conformity with agreed criteria. Nominees may "range from distinguished scientists of international stature to scientists in the early stages of their career," and "each side may send up to 20 scientists annually for visits of 1 to 12 months, not exceeding an exchange quota of 50 person-months annually." In addition, the academies "agree, insofar as possible, to support exchanges for which candidates are invited through the sending academy by the receiving academy.... These visits will be in addition to the quota set forth."

The agreement also calls for up to four workshops in the USSR and four workshops in the US during the next two years (not 12 workshops as anticipated in the draft "Protocol of discussion" negotiated by a team last year—see PHYSICS TODAY, April, page 57). "Generally, these workshops shall last 3–5 days and may be followed by visits of one to two weeks to scientific institutions in the host country," states the agreement. The number of participants is to be about 10 from each side. Unlike previous agreements, the new agreement provides for a formal review after two years.

Scientific exchanges with the Soviet Union have been in effect uninterruptedly since 1959 and usually have been renewed every two years or so. The most recent agreement was in 1980, but it was not renewed. The part of the agreement calling for exchanges was extended informally year by year, but symposia provided for by the agreement did not take place. Prior to 1980 there had been bilateral symposia on such subjects as radioastronomy, partial differential equations and communication with extraterrestrials.

The new agreement differs from earlier agreements in that it puts much more emphasis on regular meetings of academy officers and lays out specific agendas for those meetings. The provisions for joint selection of workshop topics, workshop participants and invitational exchanges also are much more specific than in the past.

—WILLIAM SWEET □